AIRS Project
AIRS Science Team
Ground Data Processing System
Launch Readiness

Science Products
Science Software

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February 13, 2002

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Agenda

- Introduction
- Science Products
- Science Software
- Quality Assessment, Validation and Analysis Tools
- Processes
- Summary

Introduction

Scope of This Presentation

AIRS / AMSU / HSB Science Objectives

Documentation Status

Scope of this Presentation

What does “Launch Ready” mean?

- Demonstration that the AIRS Ground Processing System is operable and can support on-orbit activities
  - Facility
  - Algorithms
  - Software
- A “Launch Ready” benchmark was established for delivery of code too GSFC DAAC
  - V2.1.5 December 2000
  - V2.1.6.14 February 2002
- “Launch Ready” is not the current production baseline
  - Does not include latest Level 1B, Level 2 code
  - Current software version at JPL V2.2.xx

Scope of this Presentation (cont'd.)

Scope

- **Materials used in this presentation were presented to a Review Board at JPL. The AIRS Ground Data Processing System (GDPS) Launch Readiness Review was conducted on February 8, 2002**
  - **No major findings**
  - **AIRS GDPS is launch ready**
- This presentation is being conducted to demonstrate that AIRS Ground Data Processing System at JPL is Launch Ready
  - Science Processing Software
  - Science Validation Plans
  - Calibration
- This presentation is also being conducted to demonstrate that the AIRS Science Processing Software delivered to the GSFC DAAC is Launch Ready

Scope of this Presentation (cont'd.)

Context

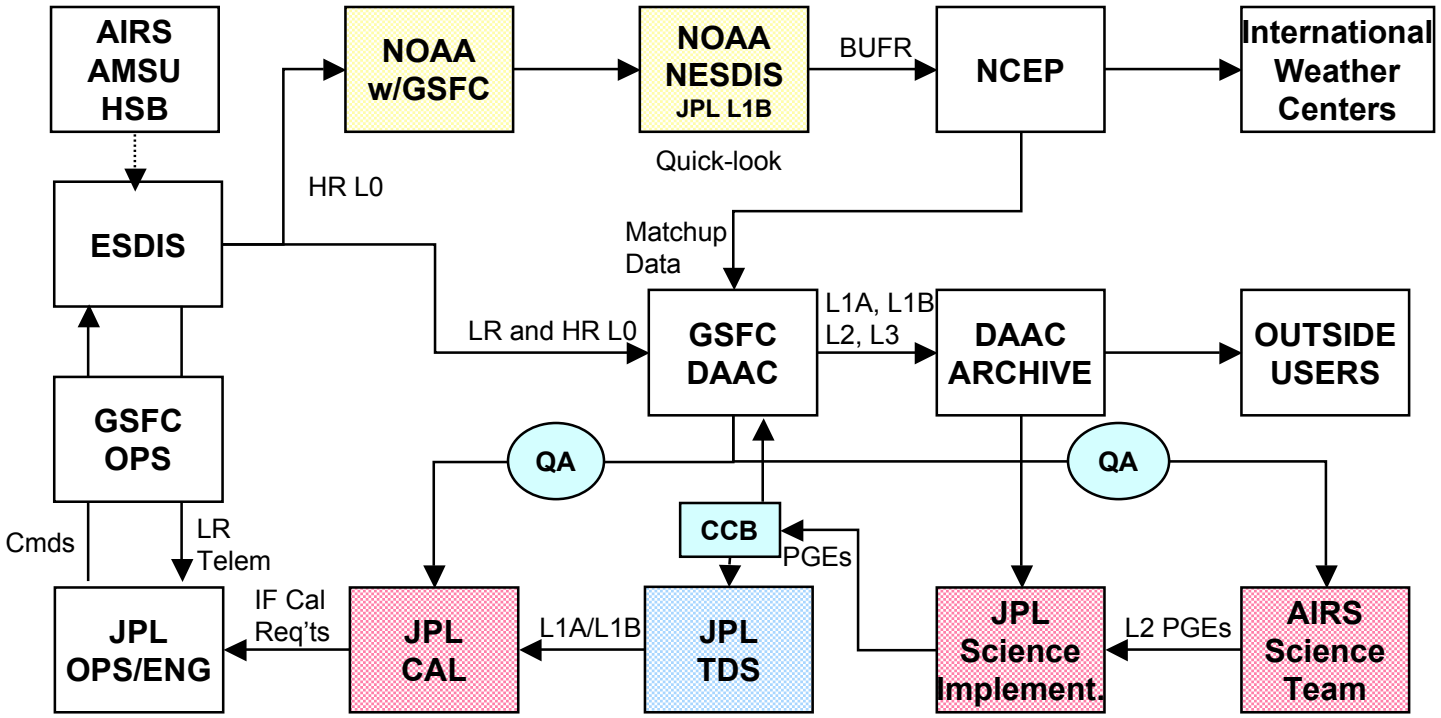
- The GDPS LRR was a follow-on to the AIRS Pre-Launch Readiness Review (flight hardware and flight operations) conducted at JPL on December 15, 2000
- AIRS GDPS Launch Readiness Review was one in a series of AIRS Launch Readiness Reviews

Other Key Launch Readiness Reviews include:

- AIRS Post TVAC Testing Procedures and Data Flow Review – October 23, 2001
- Launch and Operations Readiness Review – January 29, 2002
- Pre-ship Review (at TRW) – February 5-6, 2002
- ESDIS Aqua Mission Review (at GSFC) – February 20-21, 2002

Scope of this Presentation (cont'd.)

Context Diagram



Scope of this Presentation (cont'd.)

Well, how did it go?

The AIRS Ground Data Processing System is Launch-Ready

No major liens ! ! !

AIRS/AMSU/HSB Objectives

Objectives

- Determine atmospheric temperature to radiosonde accuracy (1K/1km, surface to 100mb)
- Investigate factors controlling the global energy and water cycles
- Investigate of atmosphere-surface interactions
- Improve numerical weather prediction
- Detect the effects of increased greenhouse gases
- Assess climate variations and feedbacks

Documentation Status

Document Title	Ver./Issue Date	Status
Experiment Implementation Plan	February 2, 1999	JPL Doc. D-8661
L1B Part 1: Infrared Spectrometer ATBD	V2.2i 11/10/2000	JPL Doc. D-17003
L1B Part 2: Vis/NIR Channels ATBD	V2.2 11/10.2000	JPL Doc. D-17004
L1B Part 3: Microwave Instruments ATBD	V2.1 11/10/2000	JPL Doc. D-17005
L2 ATBD	V2.2 04/262001	JPL Doc. D-17006
L3 Science Requirements	V1.0 Nov, 2000	DRAFT
AIRS Browse Packages and Products Spec	October, 1999	JPL Doc. D-18472
Validation Plan	V2.1.1 06/05/2000	JPL Doc. D-16822
Calibration Plan	V2.0 May, 2001	JPL Doc. D-18816
Quality Assessment Plan	V2.0 08/28/2001	In Draft, ECS Reviewing
AIRS TLSCF Operators Procedures	Living Document	Files accessible in AIRS TLSCF
TDS Data Query User's Guide	V1.11 10/3/2001	On file – *AIRSteam* website
Data Archive GUI Overview	10/3/2001	On file – *AIRSteam* website
AIRS Processing Files Description	January, 2001	JPL Doc. D-20001
Operations Agreement with GSFC DAAC	TBD	Complete, awaiting signature
Interface Control Document with GSFC DAAC	V1.0 2/13/2002	

Science Products

- Overview
- Key AIRS Data Products
- Radiance (Level 1A and Level IB)
  - AIRS Level 1A
  - AIRS Level 1B
  - Microwave
  - Vis
- Level 2
- Level 3
- Science Products – Launch Ready Status

Science Products

Key AIRS Data Products

- AIRS, AMSU, HSB, Vis/NIR calibrated radiances
- Geophysical Products
  - AIRS Level 2 Standard Products
    - Atmospheric Temperature
    - Atmospheric Humidity
    - Surface Temperature
    - Column Ozone
    - Cloud Properties
  - Cloud-cleared radiance product
- Daily Browse Products

Radiance: Level 1A

Requirements

Requirement	Passed	Comments
Create 6-minute granules by time tag	Pass	
Convert engineering quantities to physical units	Pass	
Geolocate data	Pass	Includes elevation, spacecraft, sun and moon angles, WRS grid calculation
Flag bad, missing, and test data	Pass	

Testing

- Tested using 3 days nominal sim data
- Tested with approximately 10 data sets per instrument, using real data from TRW warm and TVAC test
  - All expected input data set formats (APIDs) were exercised
- Geolocation tested by Geolocation Working Group

Radiance: Level 1B, AIRS IR

Requirements

Requirement	Passed	Comments
DN to radiance conversion	Passed	Passed in test-bed, PGE tests are in progress
Radiometric QA	Passed	Same as above
Spectral QA	Passed	Same as above
Spatial QA	Passed	Same as above

Testing

- L1B PGE validation using the test-bed to be completed by end of February 2002
- Early results show only a few minor discrepancies
- Test-bed radiances show excellent calibration accuracy when compared to external source (LABB)

Radiance: AMSU/HSB

Requirements

Requirement	Passed	Comments
Synchronize & coalign AIRS, AMSU, HSB	Passed	S/C alignment & timing verified
Implement NOAA calibration algorithms	Passed	Baseline, tested
Implement quality metrics	Passed	QA parameters in place
Monitor performance	N/A Prov.	QA post-processing under development
Ready for verification & validation	Passed	Capabilities tested

Testing

- Tested L1A and L1B with simulated data and TVAC data. No major findings.
- Geolocation & AMSU-A PRT tables to be updated
- No liens

Radiance: VIS/NIR

Overview

- AIRS includes 4 visible/near-IR channels (0.41 to 0.94 μm).
- Provides relatively high spatial resolution information (2.3 km at nadir), useful for investigating anomalous IR/Microwave retrievals.

Goals

Requirement	Passed	Comments
Aid in identification of clear and cloudy scenes	Pass	
Identify regions with highly variable surfaces	Pass	
Provide contextual information	Pass	

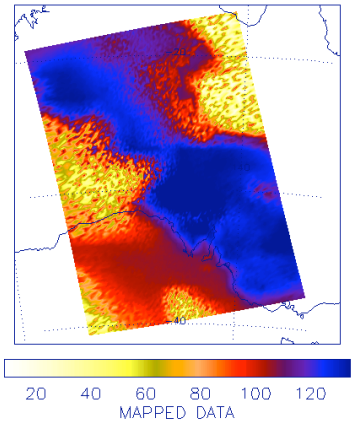
Testing

- Critical calibration and cloud detection software extensively tested with MODIS/Terra data, as well as with simulated data.
- Instrument and software performing as expected.

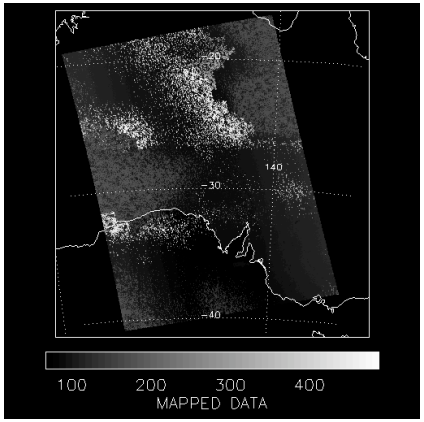
Radiance: VIS/NIR (cont'd.)

Contextual Information

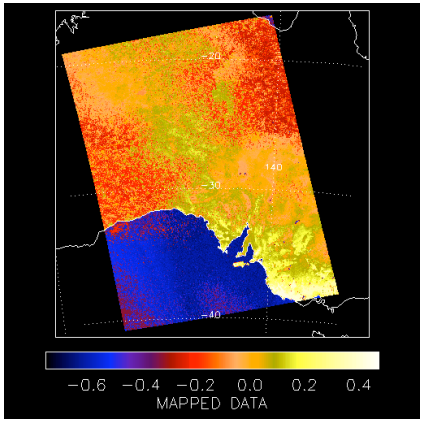
- Reports radiances, reflectivities and NDVI (Normalized Differential Vegetation Index).
- Images of the above useful during interactive analysis.



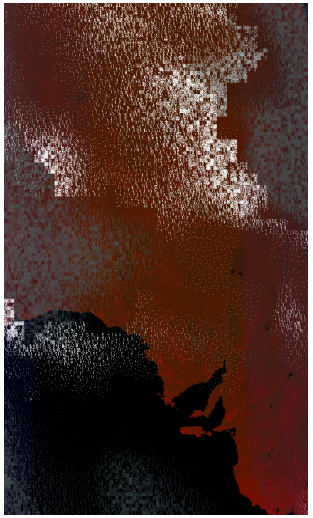
IR window channel (highlights temperature)



Vis/NIR Channel 1 (highlights clouds)



Vis/NIR NDVI (highlights vegetation)



Vis/NIR three-color image. (Red indicates surface, white is thick cloud, blue is thin cloud)

Radiance: VIS/NIR (cont'd.)

Calibration

- Ground data indicate overall system response stable to better than 2% per day, with RMS noise less than 0.2%.
  - On-board systems remove short-term variations.
    - Blackbody cavity provides "dark current" measurements every scanline.
    - Three, redundant, on-board lamps observed periodically for gain updates.
  - Vicarious calibration for long-term variations.
    - Use ground sites for absolute calibration.
    - Repeat process every 3 to 6 months to confirm on-board bulb performance and track long-term changes.

Radiance: VIS/NIR (cont'd.)

Validation Plans

- Radiances validated against well-characterized ground targets (such as Railroad Valley Playa, Nevada). Accurate to better than 10%.
  - Close coordination with the MODIS Calibration Team.
  - Have fully tested this process, and successfully calibrated MODIS data using actual spacecraft and field measurements.
- Geolocation validated by comparing coastlines and surface features to other data sets. (Accuracy of only ~2 km required.)
  - World coastline database and digital elevation models.
  - AVHRR and MODIS data.
- Cloud detection validated with spot checks.
  - Over ground sites which provide cloud information (ARM CART, UCSB).
  - In several regions, verify that all clouds the human eye can pick out in AIRS and MODIS images are identified by the algorithm.
- Surface variability index validated with radiances.

Science Products: Level 2

Requirements

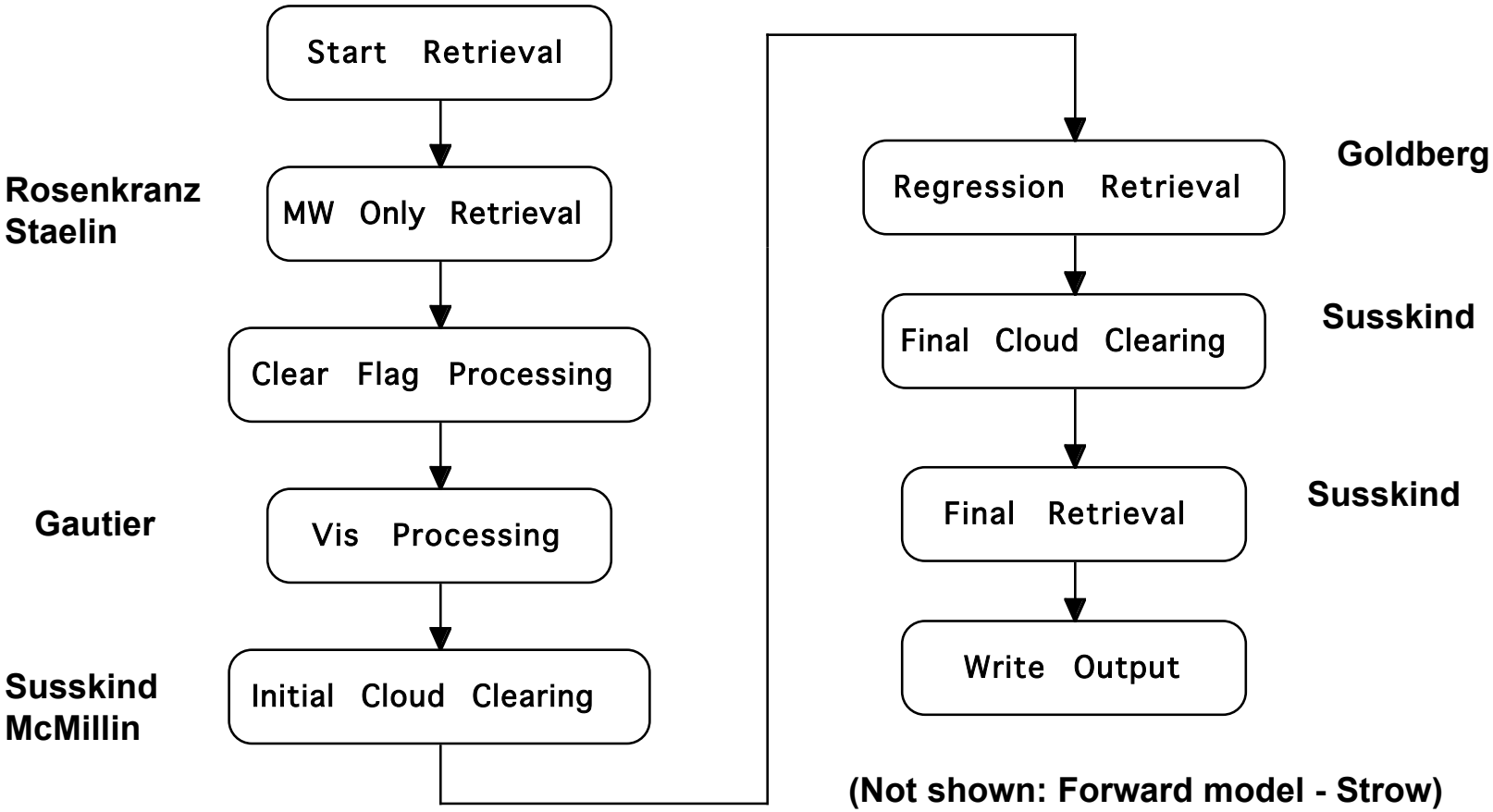
Requirement	Passed	Comments
Temperature error less than 1K in 1km layers in troposphere	Pass	< 0.8K based on simulations
Water vapor error less than 20% in 2km layers in lower troposphere	Pass	< 15% based on simulations

- Current JPL version is launch ready, as it meets the requirements based on simulations - L2 not required at the DAAC until L+12 months

"Global soundings with radiosonde accuracy."

Science Products: Level 2 (cont'd.)

Level 2 Flow Diagram



Science Products: Level 2 (cont'd.)

L2 Simulation

- To demonstrate pre-launch algorithm capability, AIRS developed extensive geophysical simulation system
  - AVN forecast for atmospheric state
  - Trace gas climatologies
  - Multiple cloud layers
  - Surface variability
- Extended simulation to cover three days to
  - Exercise and test operational scenarios in the TDS
  - Exercise and test the NOAA/NESDIS real time system
  - Support validation tool development

Science Products: Level 3

Requirements

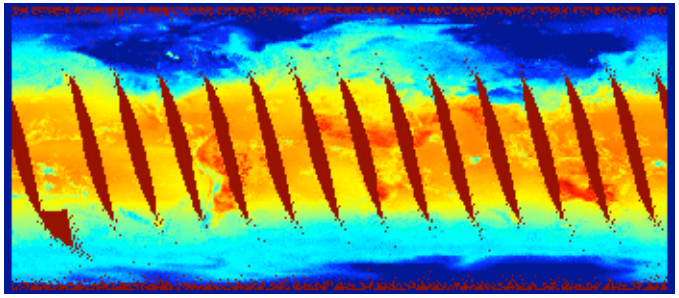
Requirement	Passed	Comments
Development of quantitative global product	N/A	Post-launch capability - L+12

- Level 3 is currently under development, in accordance to the AIRS Project Plan. A Post-launch delivery of Level 3 is scheduled for Launch + 12 months.

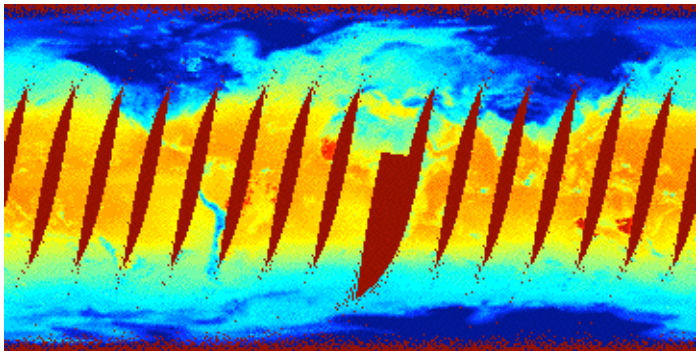
Prototype Development Status

- Prototype products are being produced and evaluated using simulated data.

Science Products: L3 (cont'd.)

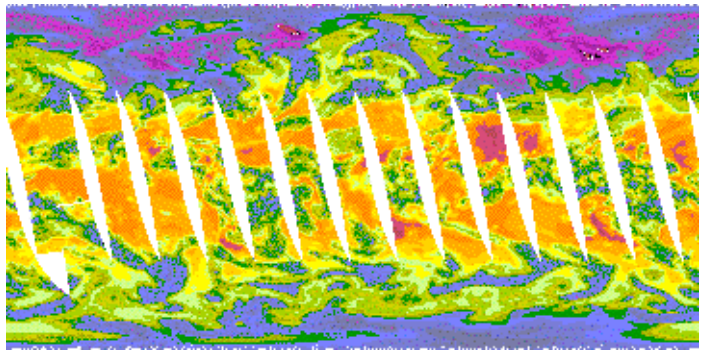


Level 2 Sea Surface Temperature - Ascending



Level 2 Sea Surface Temperature - Descending

Representative Daily L3 Products



AIRS Level 1B Window Radiance

Science Products - Launch Readiness Status

Launch Readiness

- All Science Products are complete to launch-ready status
- Updates are expected to achieve production quality products based on experience with on-orbit data

Science Software

Facility – Team Leader Science Computing Facility (TLSCF)

Science Processing Software (SPS)

TLSCF Data System (TDS)

Data Assimilation

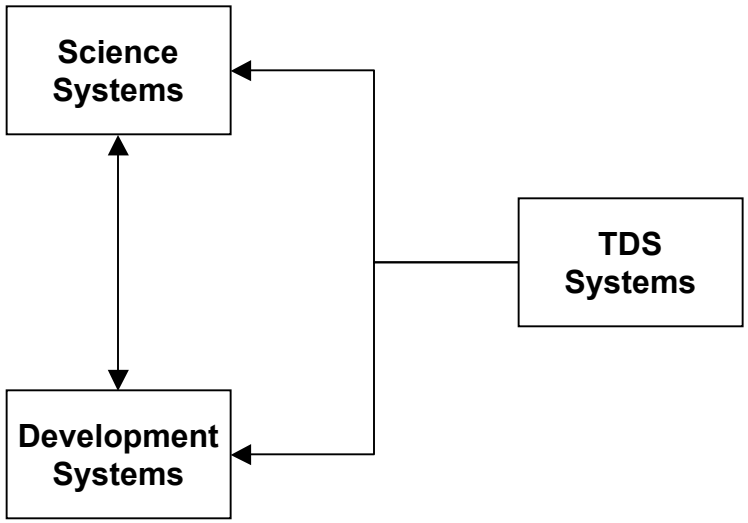
Science Software – Launch Ready Status

Science Software

Overview

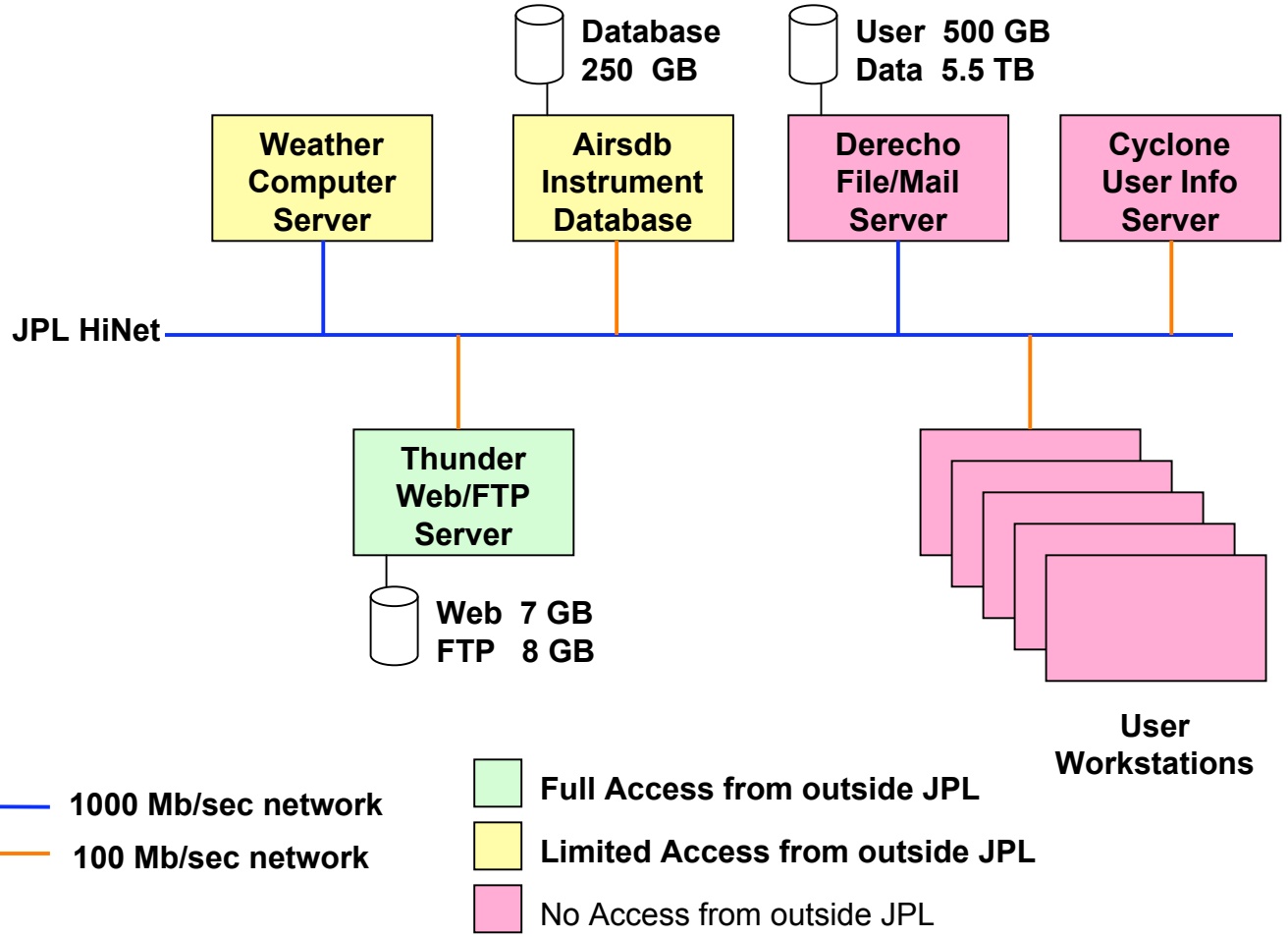
- AIRS Team Leader Science Computing Facility (TLSCF):
  - Algorithm development and testing
  - Post-launch data evaluation and algorithm refinement
- Science Processing System
  - Development of PGEs to process Science Data for production of Standard Products
  - Deliver functioning PGEs to the GSFC DAAC
  - Support quality assessment, validation operations at JPL
  - Support data assimilation activities at NOAA-NESDIS
- AIRS TLSCF Data System (TDS)
  - Data processing environment within the AIRS TLSCF, to support post-launch Science Team quality assessment and validation operations
  - Provide full data processing capability utilizing same PGEs sent to GSFC DAAC

Combined TLSCF Resources



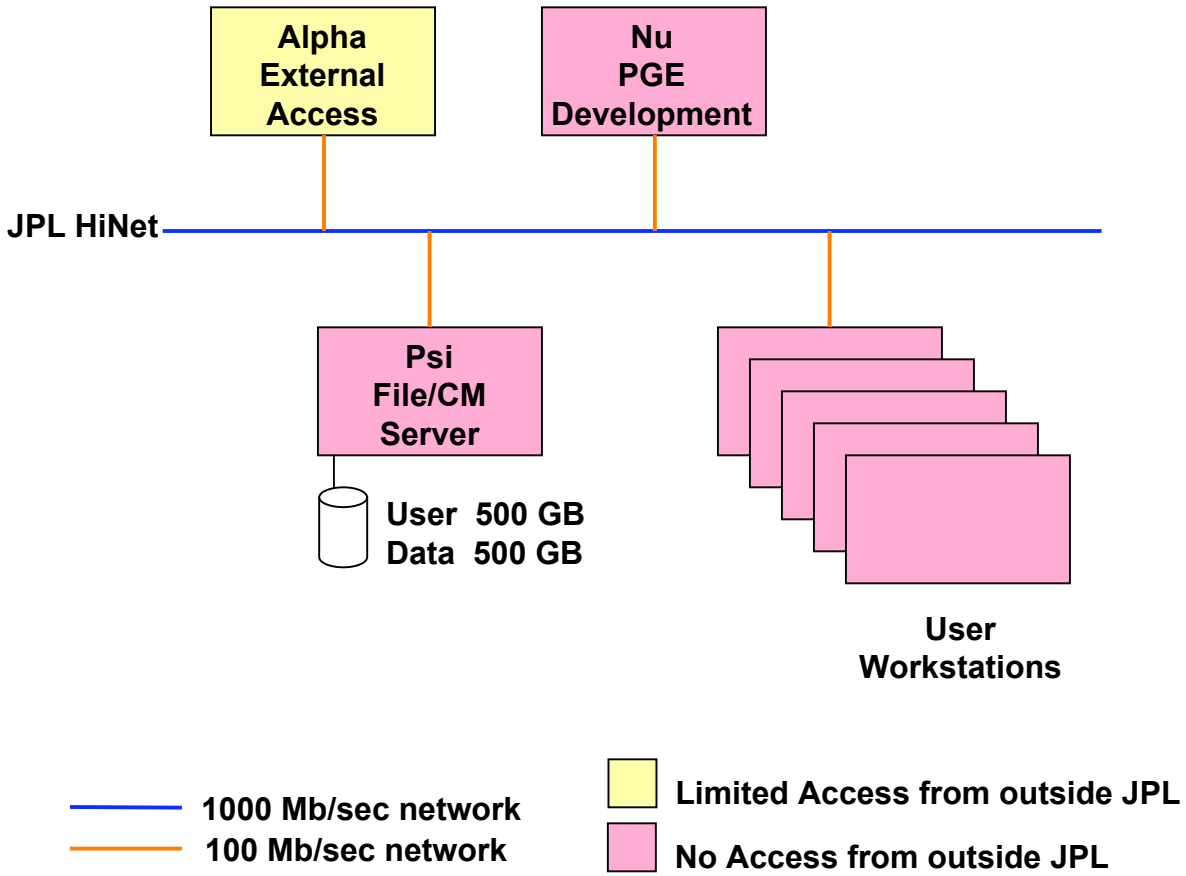
TLSCF (cont'd.)

Science Systems



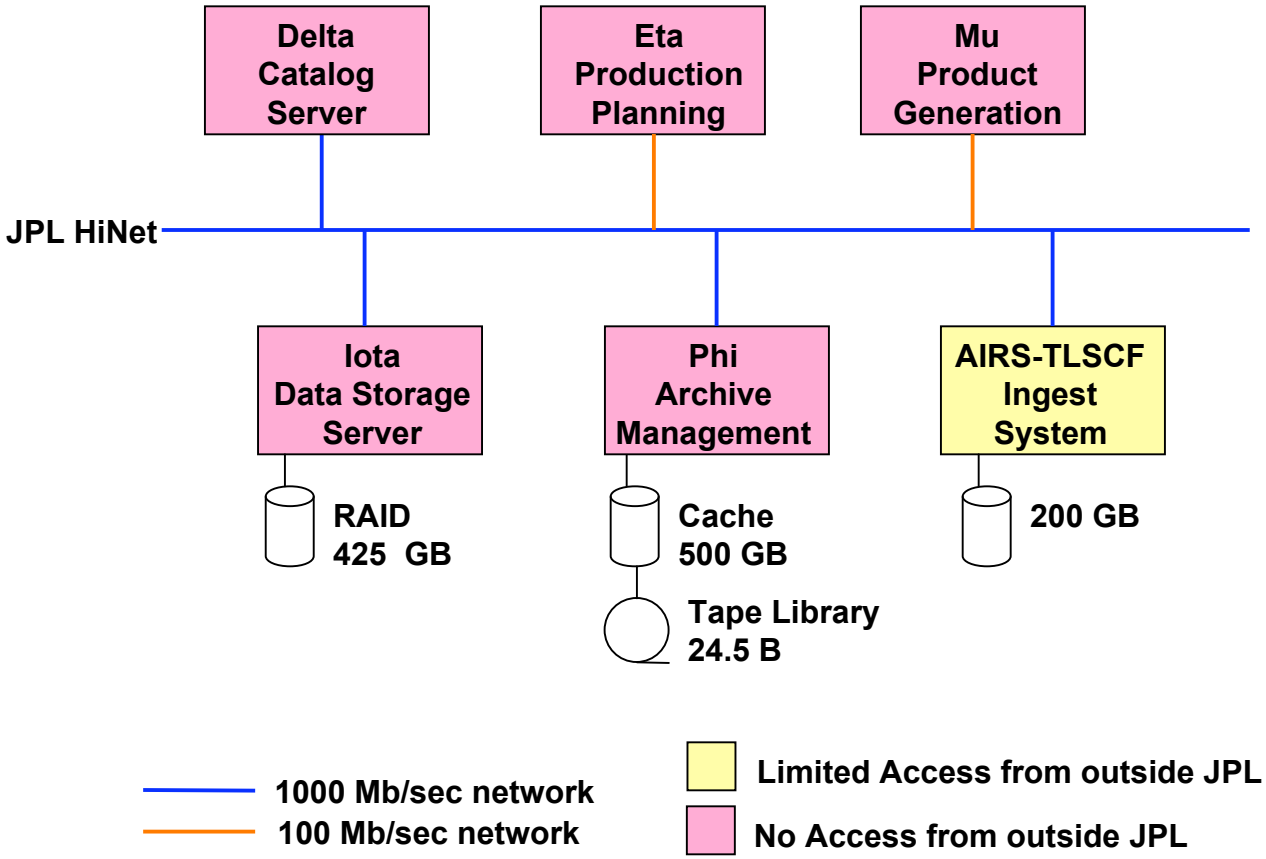
TLSCF (cont'd.)

Development Systems



TLSCF (cont'd.)

TDS Systems



TLSCF (cont'd.)

JPL Information Technology Security: Implemented

TLSCF System	Security Plan Completed	Security Plan Implemented	Security Plan Audited	Security Plan Approved
Science	✓	✓	✓	✓
Software Development	✓	✓	Awaiting Audit	
TDS	✓	✓	Awaiting Audit	

Additional Security

- Secure access required from outside JPL (ssh or VPN)
- Systems connecting must be approved in advance
- Critical systems have limited user access, even within JPL
- Web server specifically prevented from communicating with other systems

Science Processing System (SPS)

Overview

- Development of PGEs to process Science Data for production of Standard Products (ESDTs)
  - Level 1A, Level 1B, Level 2 and Level 3 PGEs
  - Daily Browse and Radiosonde Match-up PGEs
  - Daily and Multi-day Vegmap PGEs
  - Validation Match-up PGEs (JPL use only)
- Deliver functioning PGEs to:
  - TDS (at JPL) – supports quality assessment validation operations at JPL
  - NOAA-NESDIS – support improved weather prediction
  - GSFC DAAC – support NASA Earth Science Program

SPS (cont'd.)

Functional Requirements

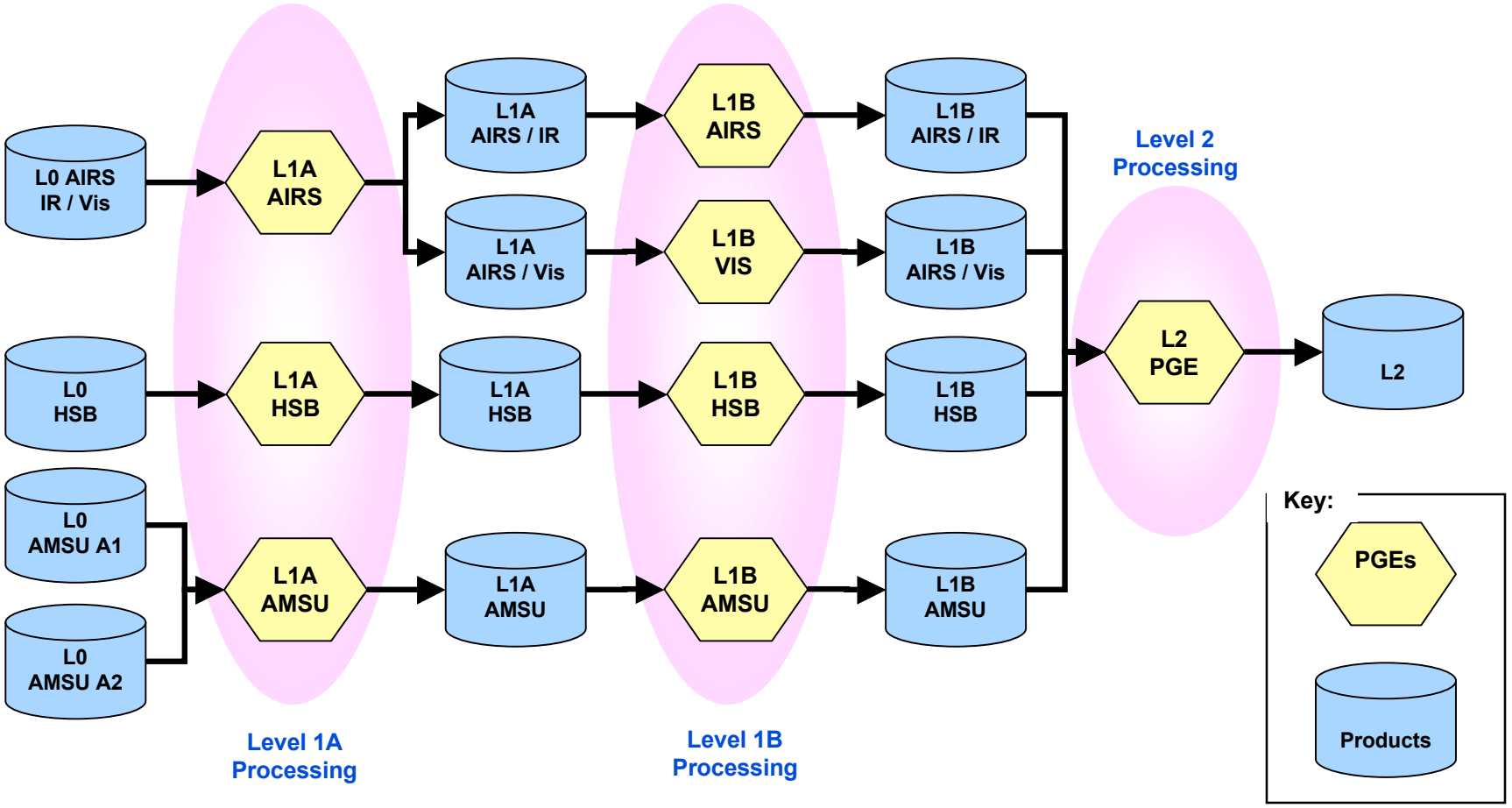
Requirement	Passed	Comments
Receive and Ingest L0 data	Pass	
Receive and Ingest other support data	Pass	
Process data through Levels 1A, 1B,and 2	Pass	
Produce Daily Browse products for L1B and L2	Pass	
Produce Daily Match-up file	Pass	
Produce 1-day and mult-day vegetation index maps	Pass	
Produce ESDTs for insertion into GSFC DAAC	Pass	
Adhere to ESDIS software standards	Pass	
Develop specialized PGEs for use at JPL's TDS	Pass	

Delivery Requirements

Requirement	Passed	Comments
Deliver PGEs to GSFC DAAC	Pass	
Deliver PGEs to NOAA NESDIS	Pass	
Deliver PGEs to JPL TDS	Pass	

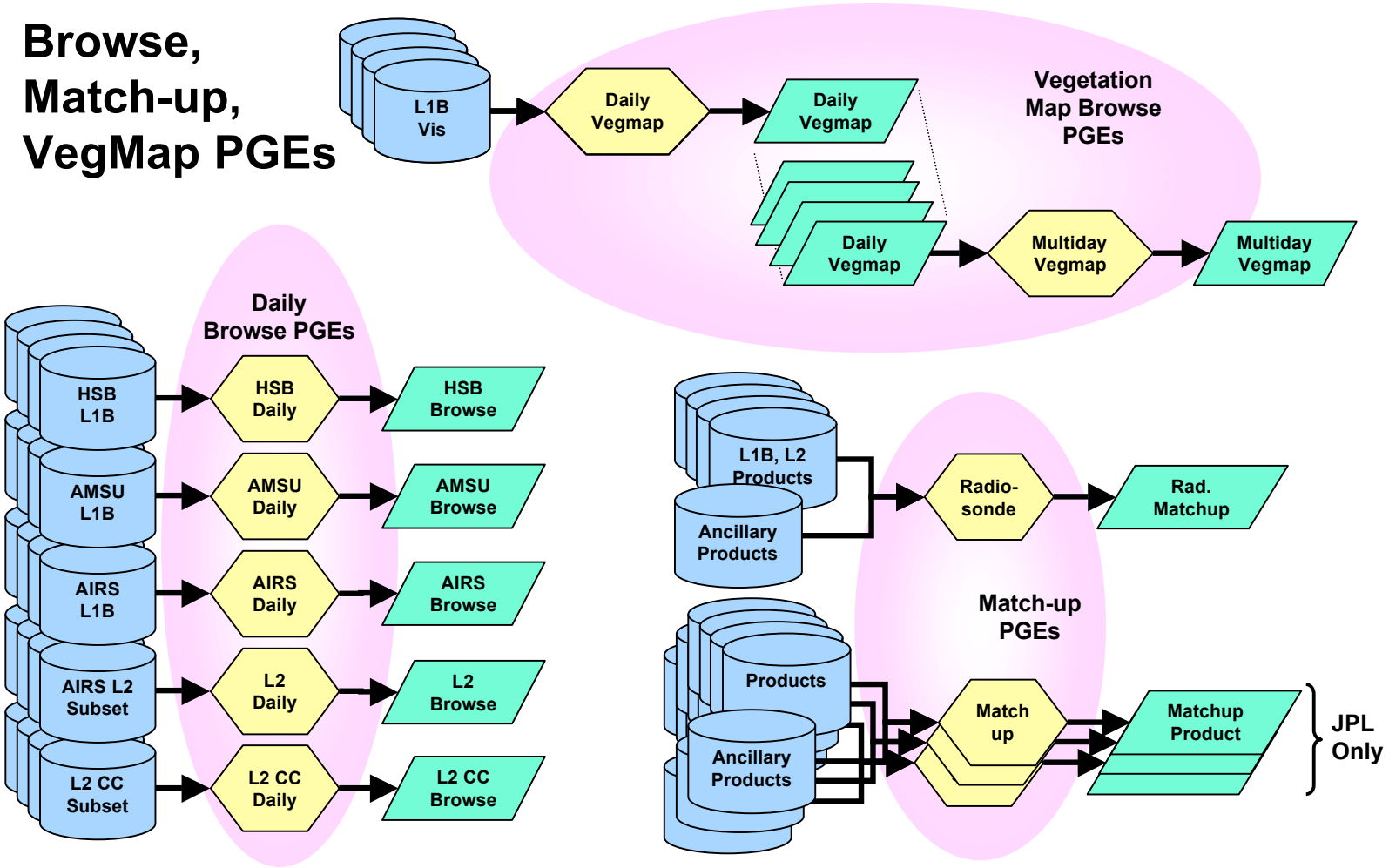
SPS (cont'd.)

Mainline PGEs and Standard Products



SPS (cont'd.)

Browse, Match-up, VegMap PGEs



SPS (cont'd.)

Launch-Ready SPS Software Status

- Launch-ready SPS software has been delivered to GSFC DAAC
- Small overload patch being prepared (not launch critical)

Data Product	S/W Version at DAAC or SIPS	S/W Version Needed for Launch	Delivery Date for Launch Version	SSI&T Completed
Level 1A	V2.1.6.14	V2.1.6.14	2/04/02	2/11/02
Level 1B	V2.1.6.14	V2.1.6.14	2/04/02	2/11/02
Level 2	V2.1.6.14	V2.1.6.14	2/04/02	2/11/02
Level 3			N/A*	
Level 1C			N/A*	

* Level 3 software under development at JPL is scheduled for post launch delivery. Level 1C (trending statistics) is being considered as a special PGE.

SPS (cont'd.)

SPS Testing

- Data from TRW warm test and TVAC tests
  - Processed at JPL TDS with no major problems
- Launch-ready PGEs most recently tested during MOSS 6 testing at JPL TDS and GSFC DAAC
  - JPL TDS ingested 3 days L0 data, processed 24 hours through L1B, 8 hours through L2, and Daily Browse PGEs
  - GSFC DAAC processed data with no major problems
- Operational Loading Test in TDS underway
  - Exercises post-launch versions of PGEs using 3 days of simulated data

TLSCF Data System (TDS)

Overview and description

- The TDS is designed to support an aggressive data calibration and validation schedule
  - Process/Reprocess all AIRS / AMSU / HSB data from L0 through L1B
  - Periodic ***Golden Day*** processing
    - L0 through L2
    - Plan to process one day of data every three months
- The TDS minimizes the impact of latency in SPS changes when compared to SPS updates to the DAAC
  - Latency
    - TDS has access to the latest tested and prototype SPS upgrades
    - SPS deliveries to the DAAC are scheduled, documented in ICD
  - TDS maximizes flexibility to react to unexpected events

TDS (cont'd.)

Overview and description (cont'd.)

- After Launch +12 months, TDS activities will shift emphasis to:
  - Archival of selected data
  - Process 10% of Level 0 data
  - Special science support

TDS (cont'd.)

Requirements

Requirement	Passed	Comments
Receive and archive all files subscribed from GSFC DAAC: including all Level 0, ancillary files, and all GSFC DAAC processed granules	Pass	
Provide data catalog and file retrieval service for the Science Team	Pass	
Capability to receive and install new software baselines or test versions of SPS PGE software.	Pass	
Execute each PGE in accordance with production rules	Pass	
Support processing data simultaneously: Process with baseline version of PGEs, L0 through L1B, and produce all Match-up and L2 Match-up products Reprocess previously processed data with new software baseline Occasional processing/reprocessing of selected *Golden Days* to generate all products with either test or baseline versions of PGEs	Testing In Process	

TDS (cont'd)

SPS PGEs supported by the TDS

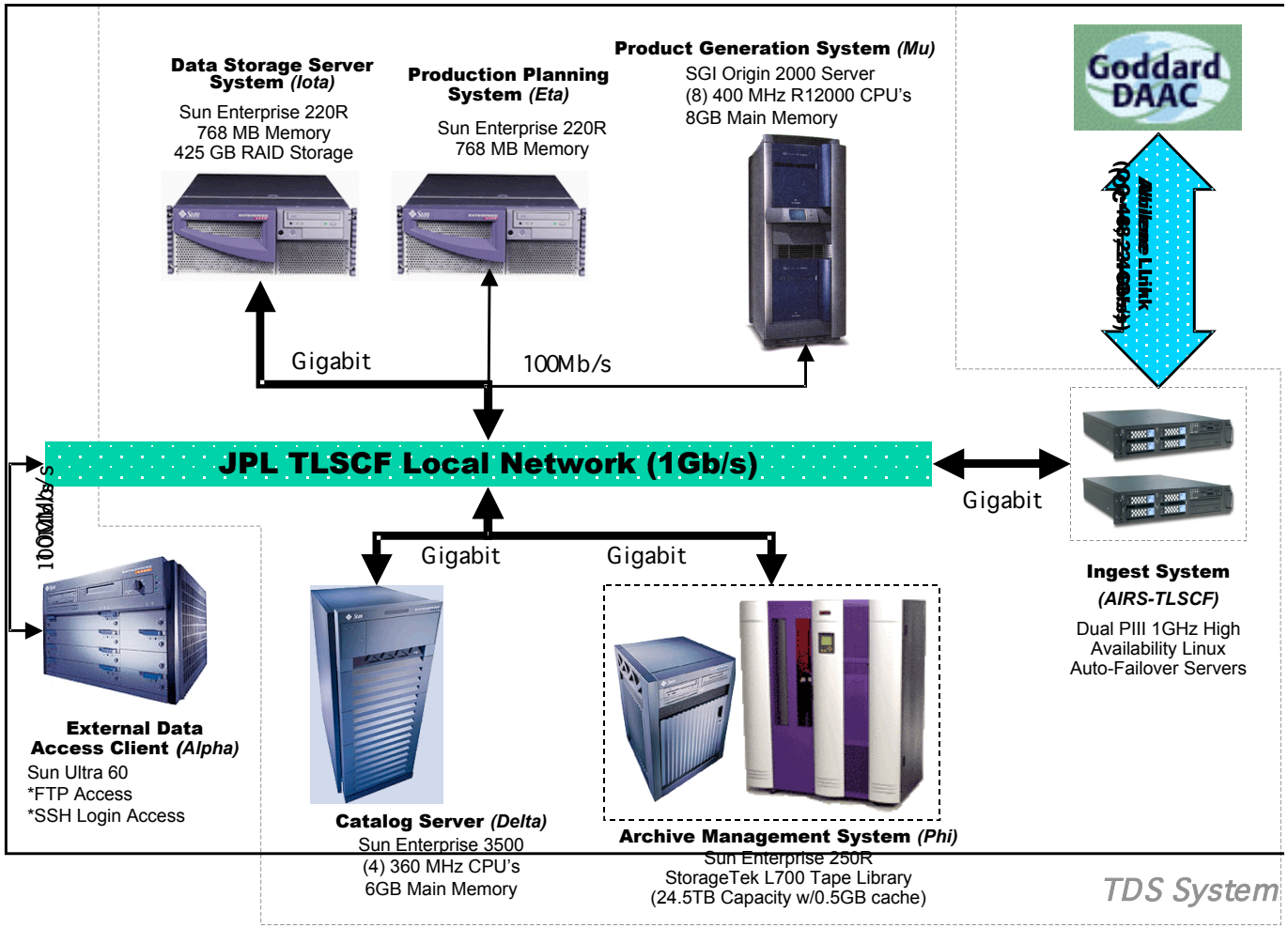
- L1A PGEs
- L1B PGEs
- L2 PGE
- Browse PGEs
- Radiosonde Match-up PGE
- Vegetation Map PGEs
- Validation Match-up PGEs (for use in JPL TDS only)

L1A and L1B PGEs:
- AIRS IR
- AMSU
- HSB
- AIRS Vis

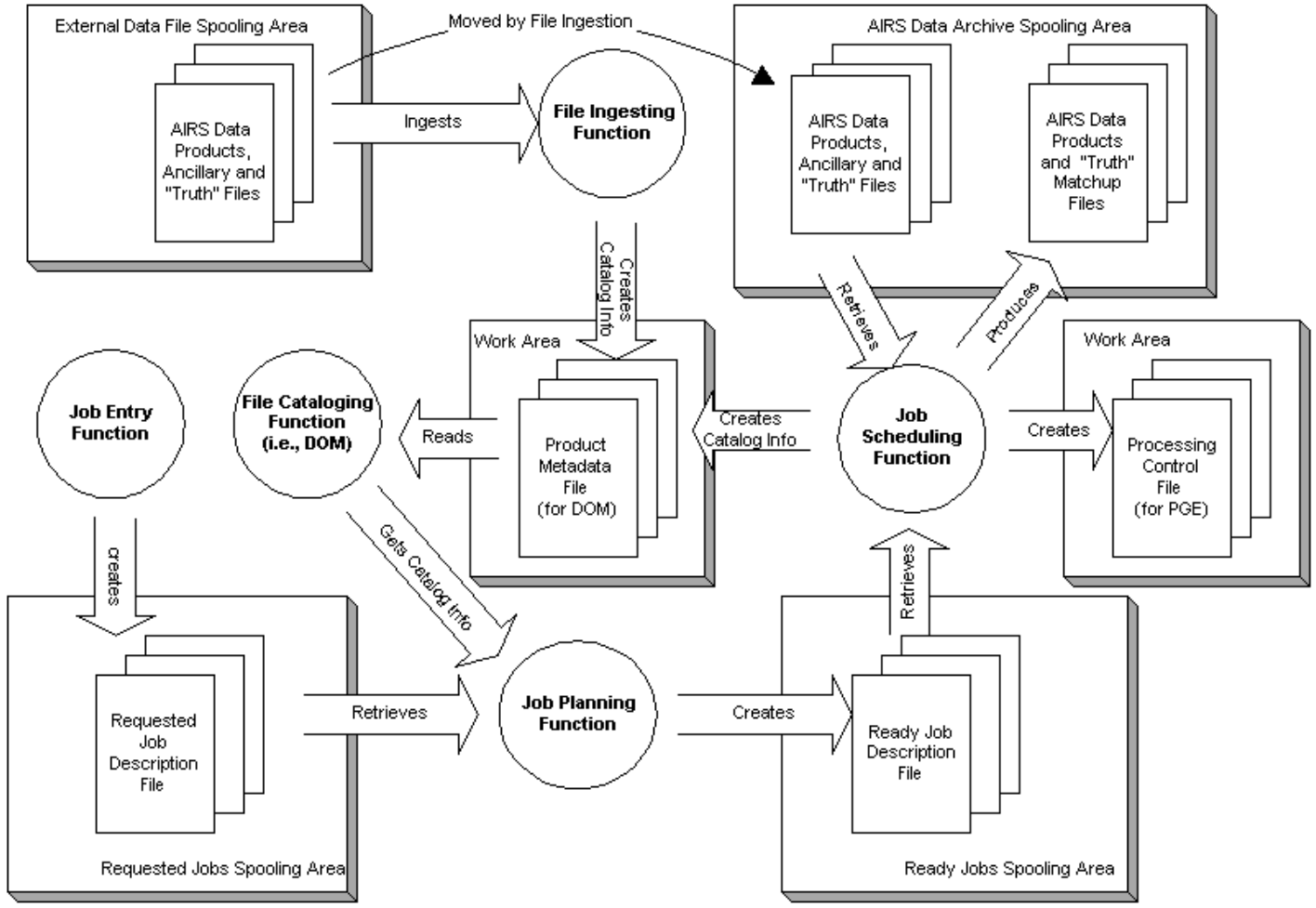
Future Integration

- L3 PGEs
- L1C (L1B Post-processing PGEs – trending)

TDS Hardware Configuration



TDS Software Architecture



TDS Pre-launch testing

Operational Loading Test

- End-to-End TDS testing to demonstrate readiness to handle sustained automated data processing operations

- TDS Operational Loading Test will test:
  - TDS environment
  - PGEs in TDS environment
  - Interfaces (include simulated Level 0 ingest)
  - TDS Production Rules
  - Operations
  - Data access to archival storage
  - Versatility and Upgrade

TDS Pre-launch testing (cont'd.)

TDS Operational Loading Test Plan

- Phase I – System Checkout
  - Verify basic operability – PGEs, interfaces, operations
  - Process three days of simulated Level 0 data
- Phase 2 – Sustained Operations
  - Verify TDS is ready to support post-launch operations
    - 1X loading – Basic processing L0 through L1B
    - 2X loading – Basic processing + reprocessing through L1B
    - 3X loading – Basic processing + reprocessing + *Golden Day to L2 (processing goal)*
  - Verify that multiple processing environments can be supported
  - Verify that access to data archive can support Science Team needs

TDS Pre-launch testing (cont'd.)

Test Results

- Phase I Completed
  - TDS and embedded PGEs performed as expected
  - Tuned system to facilitate throughput
  - **No major problems**
- Phase II
  - MOSS 6 testing preempted beginning Phase II test until the week of February 4
  - Began 1X operations
  - **No major problems**

Data Assimilation

Overview

- NOAA-NESDIS to utilize AIRS Level 1 PGEs to process data in their own facility
- JPL provides frequent software updates to NOAA-NESDIS after testing in TDS
- NOAA-NESDIS receives Level 0 data directly from EDOS

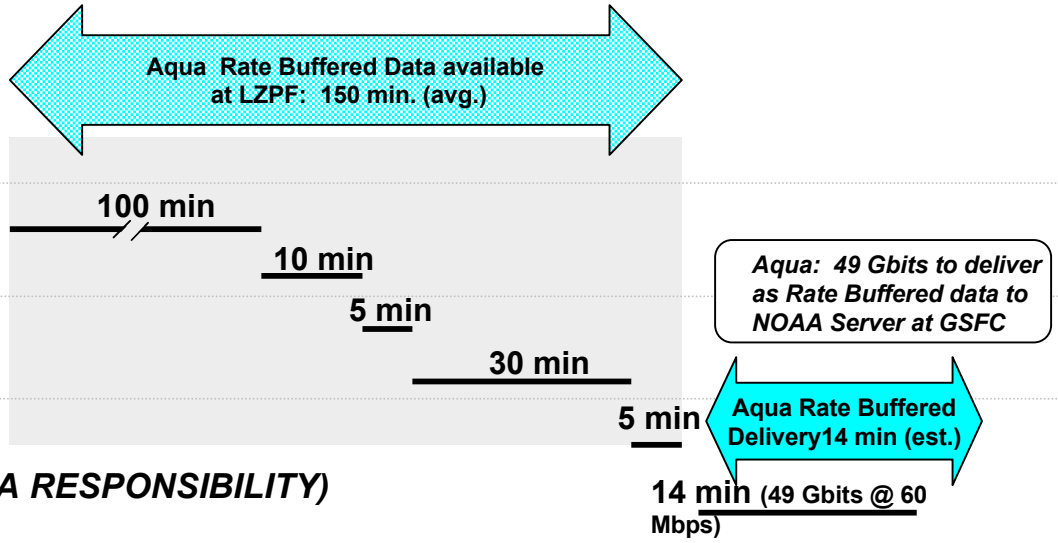
Requirements

Requirement	Passed	Comments
Provide AIRS GDPS Level 1 PGEs to NOAA-NESDIS	Pass	Algorithm updates are provided from JPL
Monitor EDOS to NOAA-NESDIS data transfer pipe. Maintain cognizance that NOAA-NESDIS is receiving L0 data within 3 hours of data acquisition	N/A	Mission Goal – not an implementation requirement placed on JPL

Data Assimilation (cont'd.)

Aqua Rate Buffered Data Latency

- Orbit
- Downlink
- GSIF Processing
- 52 Mbps DOMSAT Transfer
- LZPF Pre-Processing
- *Rate Buffered Delivery (NOAA RESPONSIBILITY)*



Slide courtesy of EDOS

Science Software - Launch Readiness Status

Launch Readiness

- All Science Processing Software is complete to launch-ready specifications
  - GSFC DAAC using Version 2.1.6.x SPS
  - TDS using Version 2.2.x SPS, Version 2.2.x TDS
- Additional work is required
  - To achieve production quality PGEs
  - To improve performance of TDS
- A schedule exists for post-launch delivery of production level code to the GSFC DAAC:
  - Level 1A Launch + 3 months
  - Level 1B Launch + 7 months
  - Level 2 Launch + 12 months
  - Level 3 Launch + 12 months
- SPS deliveries to TDS are planned to occur more frequently

Science Software – Delivery Planning

What does "Launch + 12 months" mean?

- We must have an operational version of Level 2 and Level 3 code in place at the GSFC DAAC 1 year after launch
- Delivery includes system integration and test time at JPL and the GSFC DAAC
  - JPL SI&T 2 months
  - GSFC DAAC SI&T 2 months
- "Launch +" is better defined as "First Light"
  - Approx 40 days after launch
  - Assumes system stability is achieved as well

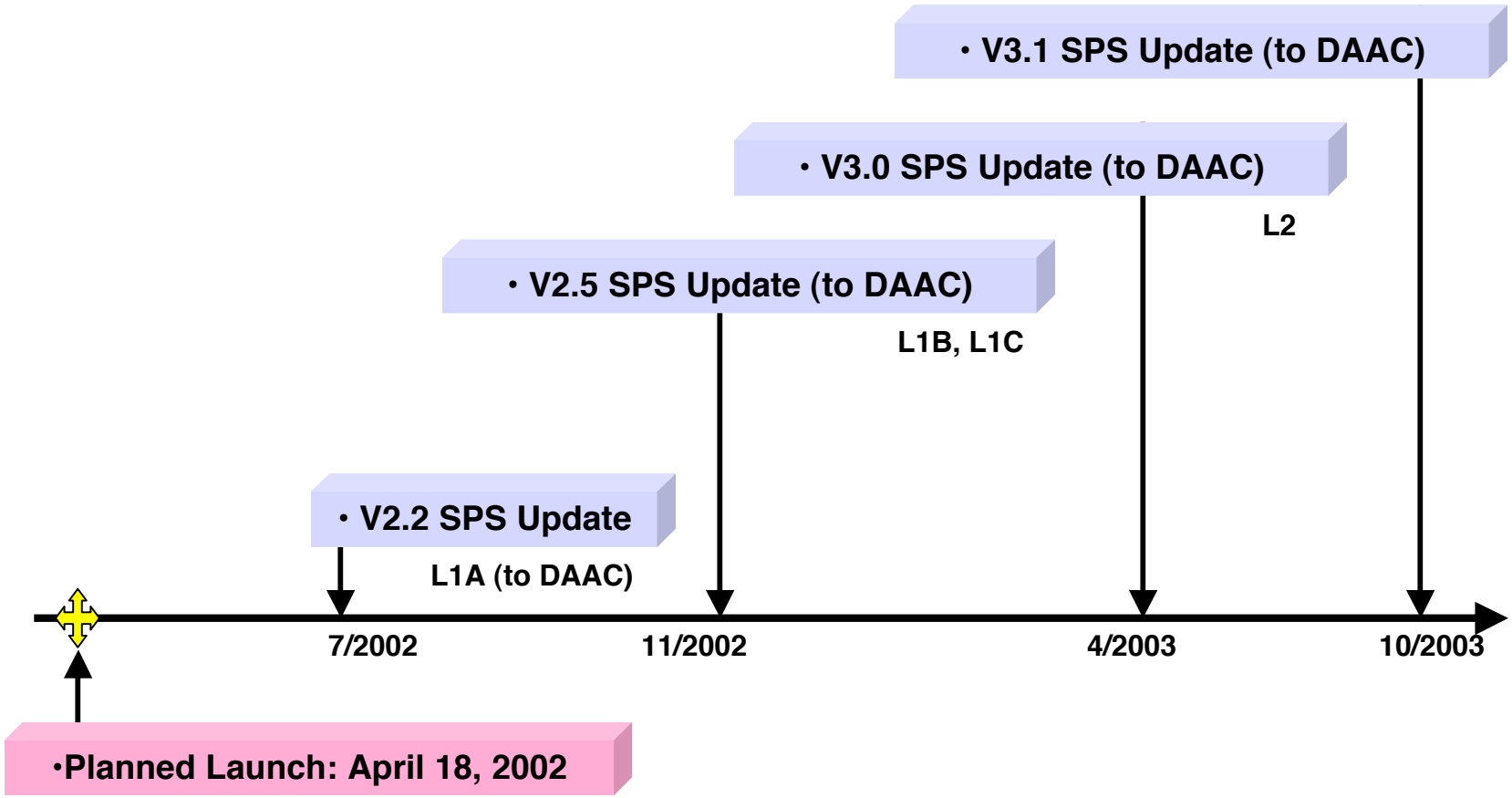
Science Software – Delivery Planning

What does "Launch + 12 months" mean?

"Launch + 12 months" is best defined as "*First Light* +…"

Level 2 and Level 3 code operational, producing standard products	**FL + 12 months**
GSFC SI&T begins	**FL + 10 months**
Delivery of Software to GSFC DAAC	**FL + 10 months**
JPL SI&T begins	**FL + 8 months**
Stable Level 2, Level 3 software	**FL + 8 months**

Science Software – Post-Launch Schedule



Quality Assessment, Validation and Analysis Tools

- Quality Assessment Plan
- Validation
- Analysis Tools
- QA, Validation and Analysis Tools – Launch Ready Status

Quality Assessment Plan

Quality Assessment Plan Status

- A draft version has been submitted to ECS personnel for review
  - Released August, 2001
  - Emphasis on launch+1 year activities (after DAAC full time processing commences).

- Remaining issue is how to announce data maturity
  - Provisional, Beta, Validated are not useable

NOTE: Long term Quality Assessment is a DAAC-related activity -- it will assume greatest importance when processing is handed over to DAAC at roughly launch + 1 year.

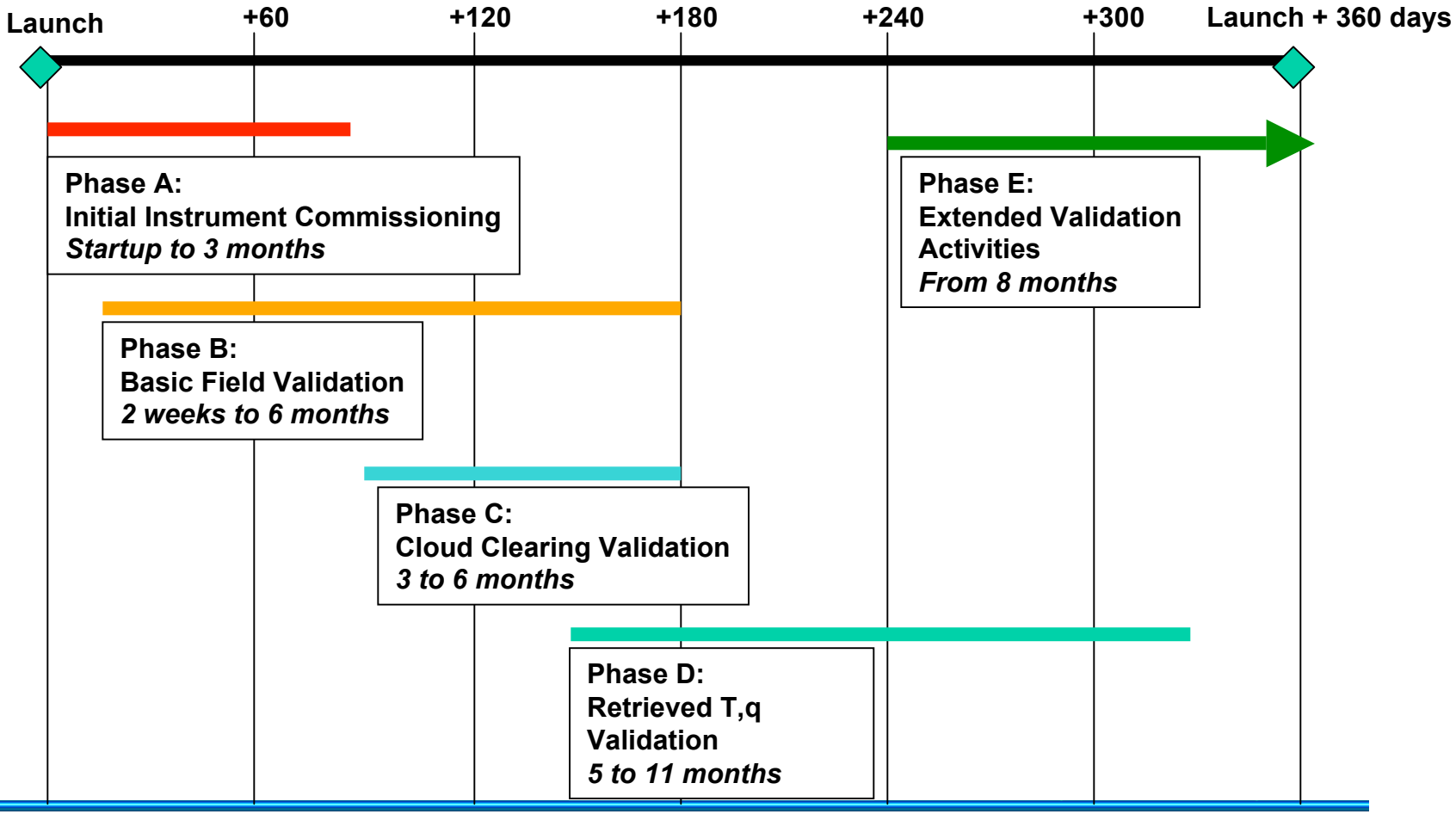
Validation

Pre-Launch Preparation for AIRS Validation Activities

- Must ensure release of ***Validated*** products at launch+12 months
- Operational data set collection has begun
- Validation Teams provide intensive observations
  - Extend from launch+2 months to launch+6 months
  - The AIRS Validation Team participates in AIRS Science Team Meetings
  - A bi-weekly teleconference is held to address validation issues
  - Non-citizen collaboration being established through JPL Foreign Affairs Office
- AIRS data are matched to validation observations
  - Currently includes operations data sets and some dedicated observations

Validation (Cont'd.)

Early Validation Timeline



Validation – Pointing and Geolocation

Requirements

Parameter	Requirement
Instrument pointing	±10% of IFOV
AIRS-HSB coalignment	±0.15°
AIRS-AMSU coalignment (along-track)	±0.25° (not to exceed 0.4°)
AMSU-A1 – AMSU-A2 coalignment	±0.2°
AIRS absolute geolocation (control)	±1°
AIRS absolute geolocation (knowledge)	±2 km

Validation approach

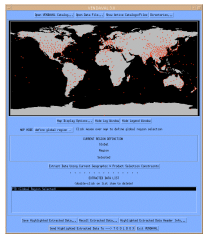
- Coastline crossing analysis
  - Each instrument aperture: AIRS/IR, AIRS/VIS, HSB, AMSU-A1-1, AMSU-A1-2, AMSU-A2
  - Results: Instrument pointing offset; Instrument co-alignment offsets
- Resulting actions
  - Update geolocation processing parameters: Instrument boresight rotation matrices
  - Update AIRS & HSB synchronization: Along-track alignment optimized for L2

Analysis Tools - Vendaval

Purpose

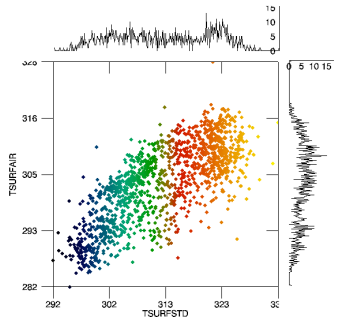
- IDL based tool developed in-house for quick look and evaluation of AIRS products on a scale ranging from global overview to individual footprint

Main Interface



- Allows for single data file or catalog of data files to be ingested
- Displays data location within zoomable interactive global map from which subsets of data may be selected for use in plug-ins
- Supports constraint of selected data by granule, scanset or AMSU footprint

Plug-ins Currently Implemented



- Scattergram
- Geolocated Color-Coded Data Slice Display
- Map-projected Data Display
- Map-projected NDVI

Other Pre-Launch Plug-Ins under development

- Instrument-space imaging tool
- Individual AMSU FOV plotter

Analysis Tools (cont'd.)

Forward Model Calculation Tools

- A set of common tools have been developed at JPL and by Science Team Member L. Strow of UMBC
  - RTA - AIRS Rapid Transmission Algorithm software package, common to all
  - RTP - Radiative Transfer Profile standard format for atmospheric profiles (UMBC defined standard, for use in radiative transfer calculations)
  - AIRS_BT - JPL developed radiance calculation software package (uses same RTA as in L2_PGE)
  - SARTA - Stand-Alone Radiative Transfer Algorithm software package (UMBC implementation of AIRS fast forward model for radiative transfer calculation, uses RTP for input/output)

Analysis Tools (cont'd.)

Satellite Overpass Predictor

- ECS-provided tool which will be used to schedule dedicated validation activities:

  http://earthobservatory.nasa.gov/MissionControl/overpass.html

EOSVIEW

- GUI-based tools provided by ECS for examining HDF-EOS and HDF files

NOESYS

- Commercial data inspection and visualization of generic HDF/HDF-EOS/NetCDF

WGRIB

- Tool provided by NOAA for accessing ECMWF and NCEP gridded files

Other commercial desktop tools

Launch Readiness

- Latest version of Quality Assessment Plan is being reviewed
- AIRS Validation Team plans have been coordinated
- Several Analysis Tools have been acquired or developed to support post-launch data analysis
- Our goal is that all *Validated* data products become available no later than Launch + 12 months

Processes

- Pre-Launch Science Team Exercises
- Change Control Board
- Communications
  - Working Groups
  - Teleconferences
  - Meetings
  - Website
  - Outreach
- Processes – Launch Ready Status

Pre-Launch Science Team Exercises

Dedicated one-week periods to exercising systems, software, and communications within the Science Team as preparation for on-orbit activities

- Support documentation
- Analysis tools
- Algorithm capabilities
- Communication and reporting
- Data access and retrieval
- Radiance bias detection
- Clear sky detection techniques

GDPS Change Control Board (CCB)

Purpose: To control software and hardware changes

Scope:

- Review proposed changes before they are implemented
  - Software Anomalies
  - Change Requests
  - New Requirements
- Approve or disapprove work for specific future deliveries

Coverage:

- AIRS CCB maintains cognizance on the TLSCF GDPS environments
  - SPS
  - TDS
  - Direct Broadcast (not covered in this review)

- AIRS Science Validation tools and software are currently exempted from CCB control

GDPS CCB (cont'd.)

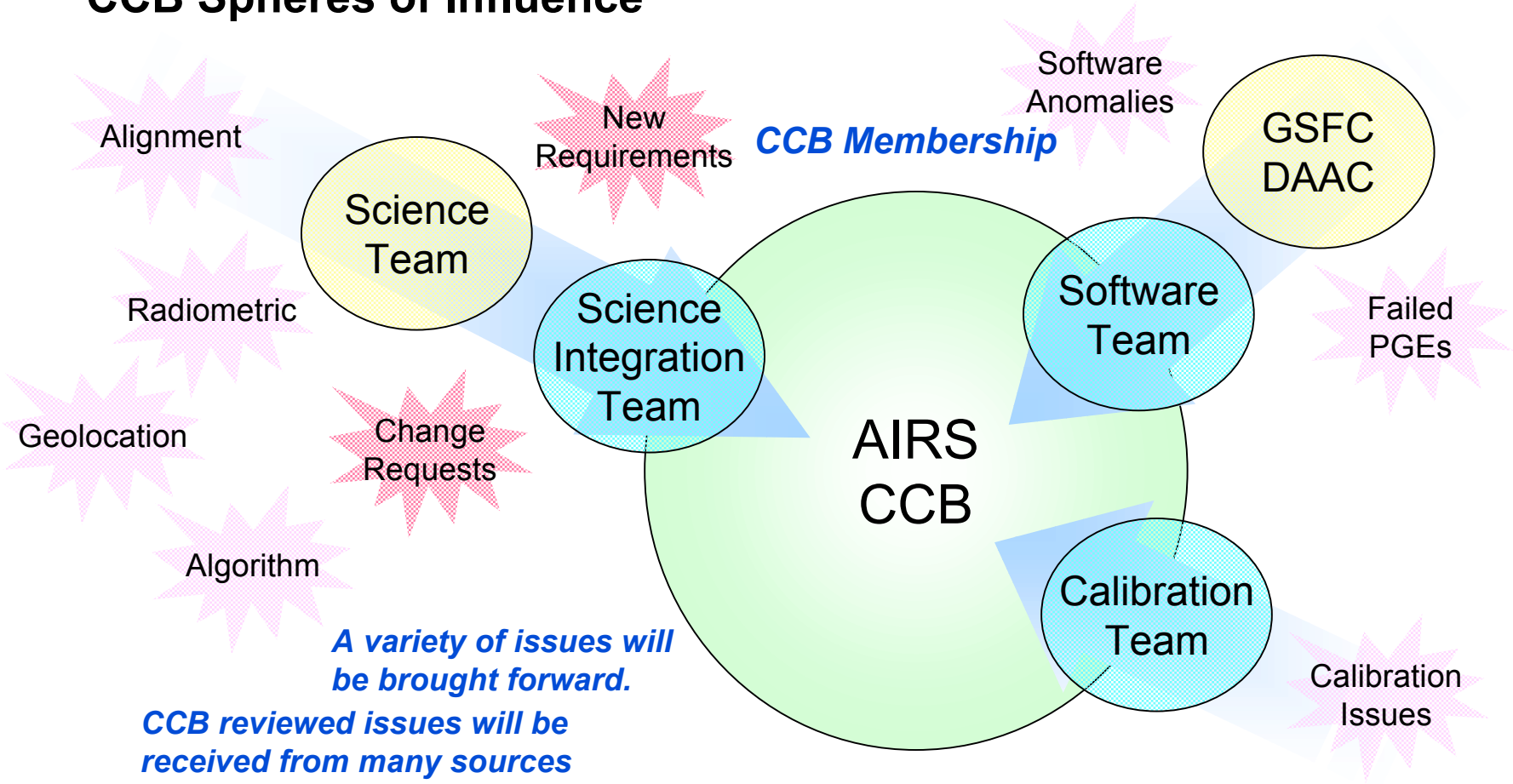
CCB Composition

- The CCB is comprised of a science integration, software development, and calibration team members:
  - Steve Friedman - CCB Co-chair
  - Mike Gunson - CCB Co-chair
  - Albert Chang - AIRS TDS Software Development
  - John Gieselman - AIRS TLSCF Facility
  - Stephanie Granger – AIRS Science Integration Team
  - Mark Hofstadter – AIRS Science Integration Team
  - Bjorn Lambrigtsen – AIRS Science Integration Team
  - Sung-Yung Lee – AIRS Science Integration Team
  - Evan Manning - AIRS SPS Software Development
  - Tom Pagano - AIRS Calibration Team

- Their goal is to *see beyond* their area of specialty and to embrace a *Project-level perspective.*

GDPS CCB (cont'd.)

CCB Spheres of Influence



GDPS CCB (cont'd.)

CCB Process

- All proposed changes are recorded in Configuration Management System
- Change packages require detailed benefit, cost, risk assessment before CCB action
- Change Control Board (CCB) reviews all change packages only after assessment is completed
- Approved changes are scheduled for a future delivery by CCB
- Changes are implemented, tested, and included for a scheduled software build

Software delivered in accordance with CCB Guidelines

- SPS and TDS Delivery to TDS environment
- SPS delivery to GSFC DAAC

Communications

Working groups

- Fundamental ingredient to our post-launch strategy for success
  - Science Team
  - Microwave Team
  - Geolocation Team
  - Validation Team
  - Calibration Team
  - Software Development Teams (TDS, SPS)
  - Quality Assessment Team - Post Processing
  - Change Control Board

- Working Groups
  - Conduct regularly scheduled meetings
  - Establish near-term and long-range goals

Communications (cont'd.)

Teleconferences

- Established coordination teleconferences to continue
  - GSFC-ESDIS (GSFC hosted)
  - Science Team (JPL hosted)
  - Validation Team (JPL hosted)
  - Calibration Team (JPL hosted)

Post-Launch Meetings

- Science Team meetings - 3x per year
- Data Assimilation workshops – 2x per year
- JPL-GSFC Coordination and Oversight – every 6 weeks

Communications (cont'd.)

AIRS hosted websites will provide timely information

- TDS Status and data processing logs
- CCB Reports
- QA Reports
- Science Validation Reports

Conferences

- AGU
- AMS
- SPIE

Communications (cont'd.)

AIRS Web sites

- Team web site
- Public web site

Outreach Products

- Color Fact Sheet, Litho, B180 Display, Traveling Display
- Banners, Poster, Buttons, Pins, (T-shirts, Mugs???)
- Videofile
- Animations, JPL & Goddard
- Media: GSFC press kit, press releases,feature stories

Launch

- Vandenberg: Guest ops folders, Pop-up Display, video loop
- JPL: Friends and Family Event

Post-Launch

- Launch+90 days press conference
- Other PR activities

Processes – Launch Readiness Status

Launch Readiness

- AIRS processes are in place and well defined to support post-launch operations
  - CCB Operational
  - Working Groups and established meetings to continue
  - Science Team continues to meet at regular intervals

Closing Statements

Open Issues

Launch Readiness Status

Summary

Open Issues

- TDS: The capability to perform data processing under operational load levels within the TDS has not been fully verified. The TDS Operational Loading Test is under way. This test should be completed within 3 weeks.

- L1B PGE Testing is incomplete. L1B PGE validation using the Calibration Test-bed to be completed by end of February 2002.

- AIRS Quality Assessment Plan needs ECS review and approval.

Launch Ready Status

Science Products	***READY for Launch***
Science Software	***READY for Launch***
Quality Assessment and Validation	***READY for Launch***
Analysis Tools	***READY for Launch***
Processes	***READY for Launch***

Summary

- AIRS Ground Data Processing System at JPL is Launch Ready
  - Science Processing Software
  - Science Validation Plans
  - Calibration
- AIRS Science Processing Software delivered to the GSFC DAAC is Launch Ready